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Are b-PDFs (and b-fragmentation functions) needed at the LHC?

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Several key processes at the LHC in the standard model and beyond that involve bottom quarks, such as single-top, Higgs, and weak vector boson associated production, can be described in QCD either in a 4-flavor or 5-flavor scheme. In the former, b quarks appear only in the final state and are typically considered massive. In 5-flavor schemes, calculations include b quarks in the initial state, are simpler and allow the resummation of possibly large initial state logarithms of the type $\log(Q/m_b)$ into the b parton distribution function (PDF), Q being the typical scale of the hard process.

An analogous classification can be applied to processes involving bottom quarks in the final state, in which the b fragmentation acts like the b PDF.

In this talk, I provide an explanation of why and how a substantial agreement between total cross sections can be obtained in the two schemes, as far as the initial state is concerned, and I present preliminary results for processes featuring heavy quarks in the final state.

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